

# ABSTRACT OF THE DISCLOSURE

The random numbers are generated so as to perform an encryption processing and an authentication processing, thereby accomplishing an in-advance computation and a parallel computation. Also, the encryption processing and the authentication processing are performed, using the generated random numbers whose length is shorter than  $2N$  with reference to the message length  $N$ . Concretely, the random numbers are generated using a pseudo random-number generator, and the generated random numbers are divided on each block basis. Also, a plaintext is divided on each block basis as well. Next, the exclusive-OR logical sums of random-number blocks  $R_i$  ( $1 \leq i \leq N+1$ ) and plaintext blocks  $P_i$  ( $1 \leq i \leq N$ ) are figured out, thereby acquiring ciphertext blocks  $C_i$  ( $1 \leq i \leq N+2$ ). Moreover, a hash function performs a key-accompanying input of the random-number blocks  $R_i$  ( $1 \leq i \leq N+1$ ), thereby generating the message authentication code of the generated ciphertext.